Claims

Claim 39. (Currently Amended) A method of manufacturing an endoluminal stent capable of radially expanding from a first diameter to a second diameter, and having a plurality of first structural elements defining a longitudinal axis of the stent and a plurality of second structural elements interconnecting adjacent pairs of first structural elements and defining a circumferential axis of the stent, comprising the steps of:

a. vacuum depositing a stent-forming metal onto an unpatterned, exterior surface of a generally cylindrical substrate to form a generally tubular, unpatterned crystalline metal film under at least one vacuum deposition process condition[[s]] selected from at least one of chamber pressure, deposition pressure, and partial pressure of a process gas, said at least one process condition optimized to minimize formation of chemical and intra- and intergranular precipitates in the bulk material;

b. defining the plurality of first and second structural elements of the endoluminal stent in the unpatterned metal film; and

c. removing the endoluminal stent from the generally cylindrical substrate.

Claim 40. (Previously presented) The method according to Claim 39, further comprising a step of depositing a sacrificial material layer onto the substrate prior to step (a) and removing the sacrificial material layer in order to remove the endoluminal stent from the substrate in step (c).

Claim 41. (Previously presented) The method according to Claim 39, wherein step (a) is conducted by ion beam-assisted evaporative deposition.

Claim 42. (Previously presented) The method according to Claim 39, wherein step (a) is conducted by sputtering.

Claim 43. (Previously presented) The method according to Claim 41, wherein the ion beam-assisted evaporative deposition is conducted in the presence of an inert gas.

Claim 44. (Previously presented) The method according to Claim 43, wherein the inert gas is selected from the group consisting of argon, xenon, nitrogen and neon.

Claim 45. (Previously presented) The method according to Claim 39, wherein the process condition controlled is deposition rate and the deposition rate is no less than about 20 nm/sec.

Claim 46. (Previously presented) The method according to Claim 39, wherein during the deposition of the stent-forming metal, the substrate is rotated.

Claim 47. (Currently Amended) A method of manufacturing an endoluminal stent capable of radially expanding from a first diameter to a second diameter, and having a plurality of first structural elements defining a longitudinal axis of the stent and a plurality of second structural elements interconnecting adjacent pairs of first structural elements and defining a circumferential axis of the stent, comprising the steps of:

a. vacuum depositing nickel and titanium onto an exterior surface of a generally cylindrical substrate to form an as-deposited generally tubular, crystalline nickel-titanium shape memory film having no less than about 51.5 atomic percent nickel, the vacuum deposition occurring under at least one vacuum deposition process condition[[s]] selected from at least one of chamber pressure, deposition pressure, and partial pressure of a process gas, said at least one process condition optimized to minimize formation of inter- and intra-granular precipitates in the bulk material of the nickel-titanium crystalline film; and

b. removing the endoluminal stent from the generally cylindrical substrate.

Claim 48. (Previously presented) The method according to Claim 47, wherein the generally tubular film of nickel-titanium has a composition of between about 51.5 and about 55.0 atomic percent nickel.

Claim 49. (Previously presented) The method according to Claim 47, wherein during the deposition of the nickel and titanium, the substrate is rotated.

Claim 50. (Previously presented) The method according to Claim 47, wherein a source of the nickel and the titanium to be deposited is a nickel-titanium alloy.

Claim 51. (Previously presented) The method according to Claim 47, wherein a source of the nickel and the titanium to be deposited is a binary nickel-titanium alloy.

Claim 52. (Previously presented) The method according to Claim 47, further comprising, prior to step (a), a step of imparting a pattern defining the first and second structural elements onto the exterior surface of the substrate, and wherein the pattern is transferred to the tubular film of nickel-titanium during step (a).

Claim 53. (Previously presented) The method according to Claim 47, further comprising a step of imparting a pattern defining the first and second structural elements onto the tubular film of nickel-titanium after step (a).

Claims 54-66. (Cancelled)

Claim 67. (Currently Amended) A method of manufacturing a medical device, comprising the steps of:

a. vacuum depositing a device-forming metal onto an unpatterned, exterior surface of a generally cylindrical substrate to form a generally tubular, unpatterned crystalline metal film under at least one vacuum deposition process condition[[s]] selected from at least one of chamber pressure, deposition pressure, and partial pressure of a process gas, said at least one process condition optimized to substantially eliminate formation of chemical and intra- and intergranular precipitates in the bulk material; and

b. removing the deposited generally tubular metal film from the generally cylindrical substrate.

Claim 68. (Previously presented) The method according to Claim 67, further comprising a step of depositing a sacrificial material layer onto the substrate prior to step (a) and removing the sacrificial material layer in order to remove the endoluminal stent from the substrate in step (b).

Claim 69. (Previously presented) The method according to Claim 67, wherein step (a) is conducted by ion beam-assisted evaporative deposition.

Claim 70. (Previously presented) The method according to Claim 67, wherein step (a) is conducted by sputtering.

Claim 71. (Previously presented) The method according to Claim 69, wherein the ion beam-assisted evaporative deposition is conducted in the presence of an inert gas.

Claim 72. (Previously presented) The method according to Claim 71, wherein the inert gas is selected from the group consisting of argon, xenon, nitrogen and neon.

Claim 73. (Previously presented) The method according to Claim 67, wherein the process condition controlled is deposition rate and the deposition rate is no less than about 20 nm/sec.

Claim 74. (Previously presented) The method according to Claim 67, wherein during the deposition of the device-forming metal, the substrate is rotated.